Exhibit 4

KRP

The Pennsylvania State University
College of Earth and Mineral Sciences
Inter-office Correspondence

Date: 27 May 1993

From: Dennis W. Thomson, Professor and Head

To: Whom It May Concern

Subject: Operation of Doppler radar wind profilers at about 915 MHz

The Department of Meteorology at Penn State University is one of several academic programs that has built and operated wind profilers for a variety of research and teaching applications. Specifically, since 1985 we have operated three different 50 MHz systems, one 404 MHz and one 915 MHz. Since each system (and its operating frequency) is optimally suited for different phenomenological studies, the radars have been used at different locations and times to support more than 25 specific student and faculty research projects. The topics of individual studies have ranged from cloud microphysics and severe storms to stratospheric dynamics and clear air turbulence.

Wind profiling radars are today the only electronic systems capable of providing essential meteorological wind and turbulence measurements on the time and space scales which are required to support modern atmospheric analysis and forecast models. These models are generally considered today to be observationally limited, that is unless input data such as that from profilers can be provided, little improvement in, e.g., forecast quality can be expected. In the case of severe storm applications, this is essentially an issue of life or death for potentially impacted citizens. Even in cases as apparently esoteric as improvement of climate models, profiler-type measurements provide the essential data necessary to establish the credibility of the parameterization methods used in the models. These models are increasingly now being used for economic and social policy decisions.

For both pedagogical and research purposes continued operation of wind profilers is essential to our graduate research and teaching program. Operation of the present (and eventually possibly other) 915 MHz system is critical for providing observational data on winds and clear air turbulence in the atmospheric boundary layer and lower troposphere and in conjunction with a collocated 94 GHz Doppler radar for measurements of dynamical processes in strati- and cumuliform clouds.

Thus, we hereby request that the FCC allocate and protect a frequency band extending from about 909 to 921 MHz for wind profiler operation. A lesser bandwidth would seriously compromise system operations for measurements of winds and turbulence in the lower atmosphere. For most of our research applications operation on a shared spectrum basis can be accommodated. Most of the transmitted energy from a profiler is directed nearly vertically and the same shielding which is used to inhibit sidelobes will protect the receiver from other possible local ground-based transmitters.

To the extent that wind profilers can and do provide essential information on hazardous and life threatening weather phenomena, e.g., clear air turbulence and severe storms, use of the above frequency band for profilers rather than AVM devices is strongly recommended. In our view the latter are merely a matter of business convenience rather than necessity. Furthermore because AVM operations involve mobile transmitters it represents an application which can potentially preclude or interfere with any other system at any location in the proximity of a road.

Finally, there are many nongovernmental wind profiler applications, e.g., for wind and turbulence measurements in the vicinity of nuclear reactors or hazardous chemical manufacturing facilities. It has been shown that wind profilers can provide the backbone environmental data required for operation of an emergency response system. Thus, we request that licensing not be restricted to any particular group(s).

cc: J.P. Breon, Penn State

CERTIFICATE OF SERVICE

I, Carol Park, an employee of Haley, Bader & Potts, hereby certify that on this 15th day of June, 1993, sent copies of the foregoing "COMMENTS OF RADIAN CORPORATION," via first-class postage pre-paid U.S. Mail to the following:

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